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ON THE

PRELIMINARY EXAMINATION

OF THE

Ontario and Quebec Railway,

FROM

OTTAWA TO TORONTO,

— BY —

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GEORGE A. KEEFER,
CIVIL ENGINEER.



OTTAWA :

PRINTED BY BELL & WOODBURN, ELGIN STREET.

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John and Herbert H. H. H.

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REPORT.

OTTAWA, MAY 4TH, 1872.

*To the Provisional Board of Direction of the Ontario
and Quebec Railway.*

GENTLEMEN,—

On the 22nd of March last I received from the hands of MR. H. J. HUBERTUS the following instructions relative to an examination of your proposed line of Railway from the City of Ottawa to Toronto:—

Ottawa, March 22nd, 1872.

GEORGE A. KEEFER, ESQ.,

Civil Engineer.

SIR,—You will be good enough, upon the receipt of the following orders, to make the necessary arrangements for an immediate personal examination of the proposed line of the Ontario and Quebec Railway between the Cities of Ottawa and Toronto.

The objective points, intermediate on the line of route, as defined by the Charter, being Carleton Place, Madoc, and Peterborough, you will endeavour, with these points for your guidance, to secure as direct a line between each point as the nature of the country will admit.

You will also note the principal topographical features of the country passed through, the nature and comparative value of the land, and any other matter that, in your opinion, may have a bearing on the question.

You will endeavor to ascertain the probable amount of traffic likely to be obtained from the most important Stations on your route.

Accompanying this, you will receive the report and plan of examination by MR. WILLIAMS, C. E., from Madoc eastward to the eastern boundary of the Township of Olden; also one by MR. FORNERI, C. E., through Marmora, Madoc and Elzevir. You will be kind enough to verify these Reports by personal observation.

You will also find enclosed Maps of the different Townships crossed by the proposed Line, with the probable route marked on them—from information obtained from the residents of the different Townships, the names of whom are appended to the Plans,—and would recommend your communicating freely with these or other parties likely to afford you any assistance or information along your Line of route.

As I am in possession of a large amount of information relative to the proposed route, and an acquaintance with persons residing on the Line, it is my intention to accompany you, and aid as far as possible in the intended selection of the Line.

Upon the completion of your examination, you will return to Ottawa, and make out your Report, accompanied by a Map of a sufficient scale to show accurately the position of the line as examined through the different Townships.

For the present purpose, your examination need only commence at Carleton Place—the line of the Canada Central Railway, already constructed, being assumed to that point.

I remain,

Your obedt. Servant,

(Signed),

H. J. HUBERTUS,

Prov. Director.

In accordance with the foregoing instructions, and in company with MR. HUBERTUS, I commenced an examination from Carleton Place Westward on the 25th of March.

Continuing the Line of the Canada Central Railway, and crossing the Brockville and Ottawa Railway south of the present Station, we strike the Mississippi River at a point favorable for crossing about half a mile west or above Caldwell's steam mill. The river at this point is about 150 feet in width, with a rocky bed and about 3 feet of water. Boaring northerly into the Township of Ramsay, we come to the point of a rocky hill in Lot No. 2 in the 5th Concession, and north of the Mississippi Lake, from which point to the western boundary of the township we have a very favorable line through an open country. Entering the Township of Lanark in Lot No. 1, in the 12th Concession, on the western boundary of this lot, we encounter rising ground, which will require

some work to surmount, from which point to Ferguson's Falls no great difficulty is met with. Passing round the northern point of the hill at this place, we bear in a straight line, through a wooded flat, for the Village of Lanark, crossing the Clyde (some 150 feet in width). A little north of the village, near McLean's Rapids, we meet with some rough ground at our point of crossing, after passing which we get into a low reach, and pass out of the Township of Lanark, in the centre of Lot No. 2, and continue in a direct line to near Playfair's Mills. At this point, or in Lot No. 1, in the 3rd Concession, our line is crossed by a ridge of sand, which will require a heavy cut. In our descent to the river, we have the advantage of a gully, which will enable us to reach the river with comparatively easy work. At our point of crossing the Mississippi River, on the same line between Bathurst and Dalhousie, we find a very favourable point for bridging, the stream being not over 60 feet in width, with good banks and rocky bottom, the depth of water about 4 feet. A corresponding gully on the opposite side enables us to rise a small summit, crossing which and passing to the south of Shank's house, we drop into the valley of Bolton's Creek, in Lot 13, in the 12th Concession of Bathurst.

Another line to this point of our route may be had further to the south, leaving the line described in the 12th Concession of Lanark, and rounding the hill at Ferguson's Falls, on the south side, and passing over the drained lands lying to the east of the Village of Lanark, and passing south of the village, cross the Clyde a little to the west in Lot No. 1, in the 2nd Concession. The land from this point to Playfair's Mills is more broken and difficult than the northern route, but on closer examination may be found preferable. At present my opinion is in favor of the northern route.

Resuming our former line, we continue up the valley of Bolton's Creek, crossing it in about Lot 5, and into the 11th Concession. As the valley contracts at Mitchell's Mills, and the banks become rocky and precipitous, it was found necessary to leave the creek; and by availing ourselves of a large valley running through the centre of the 11th Concession,

and parallel to the creek, we are enabled to pass through the remainder of Bathurst, and entirely through South Sherbrooke, in an almost perfectly straight line. This valley, for the sake of reference, we have called Moore's Valley, and by following which we have a very level and easy route to the western boundary of South Sherbrooke. This point brings us to the western boundary of the united Counties of Lanark and Renfrew, the ground passed over may be considered a fair average country for Railway purposes. The cuttings, where incurred, are mostly of earth, if not entirely so; at least, the per-centage of rock will be small, which, considering the nature of the western portion of Bathurst and all of Sherbrooke, is particularly fortunate. In entering the Township of Oso, we encounter a very difficult country, and which at first sight seems almost impracticable for Railway purposes; but that which at first appears a chaotic mass of rocky hills and ridges, or as they are more commonly called, hogs' backs, are found, on a closer examination, to assume a surprising regularity in their direction, and valleys are found extending for long distances in our line of route. To this fortunate geographical feature we are indebted not only to a practicable but most favorable line through one of the most difficult townships encountered.

I examined two routes through the Township of Oso, one following the valley of Bolton's Creek to the north, through Lot No. 23, to the head waters of the main branch in Mud Lake, and by keeping the south shore of the lake, pass through a beaver meadow, crossing the Frontenac road at Souls', or Lot No. 20, in the 6th Concession of Olden. This may be considered as a governing point on our line of route, as from my own examination and all the information I could obtain, it seems the only point practicable for our purpose for many miles, either north or south, and all the lines examined converge to this point.

The more southern line, instead of entering the valley of the creek, will bear more to the southward, from Lot No. 22 in the 7th concession to Lot No. 20 in the 3rd. From this point westward we continue in the same lot, passing south of

Warren's Lake, on the boundary between Olden and Oso, and connecting at that point with the examination made by Mr. WILLIAMS, C.E., which following the same lot in Olden, crosses the Frontenac road at the same point as our northern line. In point of direction the southern route would be most desirable, and will, I think, be found on a closer examination to be preferable.

As MR. WILLIAMS' Report embraces the country between this point and the Village of Madoc, I cannot do better than use his own description, transposing it, of course, to suit the direction of the route already described, as running towards, instead of from, his initial point, Madoc.

The only alteration I would suggest as possible, would be, that instead of crossing the Salmon River, as he proposes, near Newton's Mill, keep further north, and follow the peninsula formed between Salmon River and Cross Lake, cross the river near the outlet of the lake. A short examination would decide if it would be advisable to do so.

The following description of our route through the remainder of Olden and the Townships of Kennebec, Kaladar, Elzevir, and Madoc, is taken from MR. WILLIAMS' Report, and I have great pleasure in testifying to its perfect reliability and correctness as the best, if not the only practicable route to be obtained at all near our line of route through the above-named Townships:—

"Entering the Township of Kennebec, in either Lots 17 or 18, in the 11th Concession, we are obliged to cross a ridge of crystalline limestone, in passing from one valley to another, which will incur some heavy cutting. Continuing on Lot 17, we cross the Salmon River, just below Newton's Mill, where it is from 75 to 100 feet in width, and favorable for bridging. Following along the south side of Cross Lake, and nearly parallel with it, we find an easy and practicable route over a series of low flat ridges, with black ash and cedar swamps intervening. At the western extremity of Cross Lake a considerable area of wet swampy land occurs, caused in great part by the dams at the outlet. The ground, however, is

naturally firm and solid, and no difficulty, under ordinary circumstances, would be experienced in crossing it, as the high water only continues during the time the lumbermen are engaged in driving their logs down Salmon River. From the western extremity of Cross Lake, on Lot No. 17, in the 3rd Concession of Kennebec, we enter what is called very appropriately the "great trough," which continues without interruption to the Addington road, where we strike the head waters of the western tributaries of the Scootamatta, in Lot 16 in the 7th Concession of Kaladar, crossing the Addington road a little south of Scouten's house."

This "trough" is a deep and wide valley, and forms the "divide" between the ridges of crystalline limestone on the south and the granite or gneiss of the Bald Mountains on the north. It extends across the Township of Kaladar, and continues south-westerly into Hungerford, and as far as traced, affords an excellent site for a railway. The surface is remarkably smooth and level, and the soil tolerably dry, often timbered with hard wood. There are a few swamps and marshes on the route, but none of an objectionable character.

From our point of crossing on the Addington road, we continue south-westerly to the centre of the 6th Concession, and in Lot 7 turn, in a north-westerly direction, through a deep gap or gorge in the formation, passing through a series of ridges, which will necessitate some cutting and embankment, but nothing of a very formidable nature. Leaving this gap, we turn again in a south-westerly course, and enter a valley offering a practicable route for three or four miles along the south side, and nearly parallel to the "Little Scoot," which carries our line into the marshes of that stream, which are not, however, of a nature to offer any impediment to the construction of a railway across them, as they chiefly consist of from 2 to 5 feet of vegetable mould, resting upon a firm clay loam. The only difficulty in this part of our route is for some extent boggy ground, around the margin of a small lake, on Lot No. 1 in the 10th Concession of Elzevir; but by following the windings of the shore, sufficient room for a good firm road-bed may be obtained around the base of the hills on either

sids. These marshes extend over Lots 1 and 2 in the first Concession of Kaladar, and 1 and 2 in the 11th Concession of Elzevir, after crossing which we pass through a connection of valleys and ravines to the Village of Bridgewater on Lot No. 2 in the 4th Concession of Elzevir, crossing the Scootamattic just south of the Axe Factory, where it has a width of about 150 feet, and can be easily bridged.

From this point to Black Creek, which we cross just above its mouth, where it is about 100 feet in width, with good firm banks and rocky bottom, and a depth of from 4 to 6 feet, we pass over an almost unbroken flat, consisting of a narrow valley lying between a ridge of conglomerate on the north, and ridges of mica slate and marble on the south. Immediately after crossing Black Creek, we encounter a low ridge of slate conglomerate. Leaving the Township of Elzevir in Lot No. 2 in the 1st Concession, we enter that of Madoc in the corresponding lot in the 11th Concession, and follow a series of low flats on Lots Nos. 2 and 3, across the 11th, 10th, and 9th Concessions of Madoc, entering Lot No. 1 in the 8th Concession, and following this Lot to the Village of Madoc, in Lot No. 1 in the 6th Concession. But little difficulty is encountered in this portion of our line, as we cross into two or three low ridges, one of gravel and the remainder of marble, the ground being generally level and under cultivation.

A possible improvement may be made in that portion of the line through the western part of the Township of Kaladar, where, instead of passing through the gap before described, we continue south in the "great trough," and south of the line described, into the Township of Hungerford, striking our northern route again in Lot No. 1 in the 8th Concession of Elzevir. This southern route will avoid the heavy cuttings in passing through the gap as well as the difficulty in connection with the Lake on Lot 1 in the 10th Concession of Elzevir. It will be necessary to examine both routes before deciding which is preferable.

In reference to the character of the country through the Townships of Olden, Kennebec, Kaladar, Elzevir, and Madoc,

I cannot better describe it than by giving MR. WILLIAMS' own description. He says: "I found the country throughout of a rough and broken character, traversed by chains of rocky ridges, which, at first sight, might be supposed to present insuperable obstacles; but it will be found, on examination, that the nature of the country affords peculiar facilities for the construction of a railway running in the direction of the one proposed, and that, notwithstanding its mountainous character, level surfaces can be obtained for greater distances than can generally be obtained over tracts that do not present anything like so rugged an aspect. The hills and rocky ridges are tolerably regular in their mode of occurrence and distribution, and run in chains parallel to each other, with a straight and uniform bearing often for many miles. Between these parallel ranges of rocky hills are valleys and ravines often of considerable width, and running with the same regularity, the bottoms of which have remarkably level and flat surfaces, often containing swamps and beaver meadows, but the ground being very seldom boggy or of such a nature as to present much difficulty in obtaining a firm and solid road-bed.

"Fortunately for the present enterprise, the bearing of these ravines or valleys nearly correspond with the direction in which it is desired to run the road, so that no necessity arises for the almost impossible task of cutting through any of these ridges.

"Those valleys may often be followed for miles without a break, or scarcely perceptible elevation, and even when not running in the exact course desired, any one of them may be followed without very great deviation from the right course, until some opportunity occurs, in the shape of a gap in the rocky barriers, to cross to some other valley more nearly in the required course, and thus by connecting one of these level stretches with another, great distances may be traversed with but little cutting and easy grades."

Several extensive ballast pits, easily available, are found on the portion of our line between Bridgewater and Madoc—one immediately west of Bridgewater, through which our line runs, one in Lot No. 1 in the 6th Concession, and another in

Lot No. 2 in the 10th Concession of Madoc. The material is of excellent quality, and will be of great advantage at this central point of the route. Our line between the Villages of Bridgewater and Madoc follows the line formerly surveyed for the proposed Kingston and Madoc Railway.

From Madoc westward we are obliged to bear to the south, keeping on the north side of the valley of the Moira, and south of the high range of hills in the south-west portion of Madoc, and pass through the northern portion of the Townships of Huntingdon and Rawdon. Bearing northerly again, we enter the Township of Marmora in the 7th Concession, and cross the Crow River in the northern part of Lot No. 4 in the 4th Concession. Possibly this crossing may be improved, but it is not very formidable. At the time of examination the water was so over the bottom that the stream was very imperfectly defined, but does not exceed 150 feet in width.

Continuing on Lot 4 we pass to the western boundary of Marmora, entering Belmont in the same lot in the 1st Concession.

A line can be found through Belmont, either by continuing in Lot No. 4, which presents no engineering difficulties, as the country is comparatively level, or by turning to the north, after rounding the point of Boyd's Hill west of Crow River, pass close to the present ore bed of the Marmora Iron Works, in Lot No. 7, and continue on this lot to the western boundary of the township. I am at present in favor of the southern route as being more direct.

Entering the Township of Asphodel in Lot No. 19, we have a direct line to the Village of Norwood, in Lot No. 18, between the 8th and 9th Concession. Crossing the Ouse at this point, we pass through a gap in a gravel ridge lying on the western bank of the stream, and running for several miles to the north-east and south-west of our line. This gap affords a favorable point for getting through the ridge, the only objection being an approach through the mill-pond, and over which we are obliged to pass to reach it. It is almost 400 feet in width, and from 6 to 8 feet in depth, and will require an

embankment with the necessary waterway to overcome it. From Norwood to Peterborough we have a very direct line, keeping a little south of the town line between the Townships of Dummer and Douro on the north, and Asphodel and Otonabee on the south.

In approaching Peterborough we have some difficult country to contend with for about four or five miles to the east of the town. My examination was confined to the northern line, crossing at the town line. At best it will be an expensive one, and is the first formidable bridge encountered on the route. As near as I could judge some 500 or 600 feet of bridging will be necessary, and at a considerable elevation above the bed of the stream. By running slightly north into the Township of Smith, to follow the valley of Dixon's Creek, we avoid passing through the most valuable portion of the City property, and following the valley of the creek, pass through the north-west corner of the Township of Monaghan, and through the 14th Concession of the Township of Cavan to Mount Pleasant.

Continuing in the valley of the creek, we reach the head waters in about Lot 5 in the 13th Concession. The ground at this point becomes broken and irregular, but not difficult to cross; after which another depression or gully is struck, which carries us to the western boundary of the Township of Cavan, crossing the Port Hope and Lindsay Railway a little south of Lytle's Crossing, in Lot No. 24 in the 11th Concession of Manvers, continuing in a westerly direction through the centre of the 11th Concession, cross into the 12th Concession just west of the Village of Fleetwood, and continue in the southern portion of this concession as far as Lot No. 12.

A more northerly line, crossing into the 12th Concession immediately west of Lytle's Crossing, and joining the line just described in Lot No. 18 in the 12th Concession, can be had; but it is not as direct, and slightly longer.

At Lot No. 12 in the 12th Concession, it is found necessary to bear rapidly to the south to effect a crossing of the very wide and deep valley of Pigeon Creek, taking the valley

in a diagonal direction, and crossing the creek in Lot No. 8 in the 10th Concession. In rising the western bank we avail ourselves of a gully formed by a western tributary, which carries us in a south-westerly direction to the western boundary of Manvers, and into Cartwright in the rear of Lot No. 24 in the 7th Concession, passing into the 6th Concession in Lot No. 23, south of Montgomery's house, through a depression which extends across the ridge into the next valley, which we cross at the most favorable point near Loucks' old mill.

Another valley is crossed a little east of the Village of Williamsburgh or Cartwright. When paassing to the south of the village, we bear in a south-westerly direction through the 4th, 3rd, 2nd, and 1st Concessions of Cartwright, crossing the summit between Lakes Seugog and Ontario on the boundary between Cartwright and Darlington, near the line between Lots Nos. 3 and 4.

Our line from the Village of Williamsburgh to the summit follows the Valley of a small creek heading in Lot No. 6, in the 2nd Concession, after which we are obliged to rise rapidly to enable us to cross the summit. Between the head waters of the creek and our point of crossing the summit, the ground is broken by a series of ridges and valleys; these may be made useful and may prove necessary in enabling us to gain the necessary distance to rise the summit.

Our point of crossing was the most favorable one I could find, and is considerably lower than the general crest of the dividing ridge.

The country throughout the Townships of Cavan, Manvers and Cartwright, is broken and difficult to a degree, and the work at best necessarily heavy, and both time and skill will be requisite to determine the Line. As described, it is the most feasible one I think likely to be obtained.

Another Line, further to the North from our crossing of the Port Hope and Lindsay Railway, through Manvers and Cartwright, might be found with easier grades, but the distance would be considerably increased, and would only be recommended in case an instrumental survey of the Southern Line should develope greater difficulties than I anticipate.

The elevation of our point of crossing the summit would be about the same as that crossed by the Whitby and Port Perry Road, which is five hundred and fifty feet above the level of Lake Ontario. The Southern slope, or Ontario face of the water-shed, consists in a series of level plateaux or terraces, varying in width, and descending in steps of comparative regularity, to the level of the Lake, while the crest of the dividing ridge is of a very broken and uneven character. The formation of the Southern face enables us to drop down very gradually from our extreme elevation on the ridge.

After crossing the dividing ridge we pass through the North-West corner of the Township of Darlington, and enter Whitby about the centre of the 9th Concession, passing through the Village of Raglan into the 8th Concession, and a little South of the Village of Ashburn continue in the same Concession to the Western boundary of Whitby; entering Pickering in the same Concession, we gradually bear South into the Valley of the West branch of Duffin's Creek, crossing below the forks in Lot 12 in the 7th Concession. The direction of the Creek favoring us, we bear to the South across the 6th Concession, rising the Western bank East of the Village of Brougham, and turning to the West pass South of the Village in the 5th Concession of Pickering. From this point, to the crossing of the West branch of Duffin's Creek, at Whitevale or Major, in Lot No. 32, in the 5th Concession, the land is of a slightly rolling character, and no difficulties are met with. Crossing the Creek a little North of the Saw Mill, at a fair point for our purpose, we pass over an even stretch of ground to the Western boundary of Pickering.

Passing into the Southern portion of the Township of Markham, we cross a small stream and gully in the 10th Concession. Between this point and the crossing of the River Rouge, in the 8th Concession, the land is very level, and apart from the unavoidable work incurred in crossing the heavy gullies at the different streams, the work will be light.

These streams, crossing as they do our Line, at nearly right angles, there is no recourse but to cross them, and the only thing is to secure the most favorable point for that purpose.

The country between the streams is either of a very even, or slightly rolling character, so that the work incurred in crossing the gullies is compensated for by long stretches of very favorable country.

After crossing the Rouge between the Villages of Markham and Sparta, we pass to the South-West through the Township of Scarboro, and no gully or obstruction occurs until crossing the East branch of the Don, in the Township of York. By bearing more directly to the South on entering the Township of Scarboro, we can pass to the West of the East branch, enter Toronto parallel with the Grand Trunk. This Line would also run for some distance parallel and close to the Toronto and Nipissing Railway, and would slightly lengthen the line.

The difficulty of finding a proper entrance into Toronto, when confined to a point already crowded with the different tracks, can be easily understood. The Esplanade, at present occupied by the Grand Trunk and Nipissing Railways, unless widened, will hardly admit of another line.

An entrance on Palace Street would be most favorable for our purpose. If the permission of the City could be obtained there will be no trouble either in securing an eastern entrance, or in connecting with the Western lines.

In the event of any trouble arising in securing this point for our eastern entrance, an examination was made with a view to securing a terminus in the western part of the City, which resulted in my abandoning the idea of coming in from that quarter, as the valley of the Don and its branches in the neighbourhood of Thornhill are to all intents and purposes impracticable. And the best route I could find, where all are difficult, was by crossing the Don north of St. James's Cemetery, and utilizing the gully passing in rear of Yorkville, follow it to its upper extremity, when, bearing to the south-west, pass through the unoccupied lots in the rear of the western part of the City, and striking the small gully running south past Trinity College and Wallis's Brewery to the Lake, we obtain a favorable junction with the Great Western and other lines.

The crossing of the Don on the southern Line would be a very much easier matter than on the one just described running to the west of the City, but the grades would be heavier, as we would have the same summit to surmount as the present roads running east.

Should the western entrance at any time become necessary, I think the route I have mentioned will be the best for the purpose. Our crossing of the Don will necessitate a viaduct, as the valley is a very formidable one.

The general topography of the country passed over between the Cities of Ottawa and Toronto has been generally described in the foregoing Report, and will be found, for the greater part of the route to be of a rough and broken character, but from the direction of our Line corresponding with the trend of the valleys, a very favorable route is secured through the greater portion of the distance.

The first portion of our Line from Carleton Place to the Western boundary of the County of Lanark, though rough and broken in places, is generally favorable for our purpose, and a considerable area under cultivation; but the portion traversed is mostly bush land.

The country through the Townships of Oso, Olden, Kennebec, Kalader, and Klzevir is comparatively unsettled, as only a small proportion of the land is fit for cultivation. Our Line through these Townships is south of the granite formation, and although isolated patches of it are found in the neighbourhood the rock encountered is crystalline limestone.

From the Township of Madoc to Peterboro' a large portion of the land is under cultivation, and the remainder contains large portions of hard-wood. From Peterboro, through the Township of Cavan, Manvers and Cartwright, the country, although of a very rough description, is under a good state of cultivation,—and the land good, with about equal proportion of hard-wood bush.

After crossing the summit, the land through the Townships of Whitby, Pickering, Markham, Scarboro and York is of the finest description, and under a very high state of cultivation,—

forming one of the most productive Agricultural Districts of the Province.

The entire distance from Ottawa to Toronto by the Line, as examined, will not exceed 225 miles, and may possibly be slightly reduced. Of this, from 100 to 120 miles will be through bush land,—as even through the cultivated portions, the depressions and valleys followed are heavily wooded, and from which material for Ties, Fencing and Telegraph Poles can be obtained in any quantities.

As to the probable Traffic to be derived from the different Stations, I could not obtain very reliable information in passing so rapidly. Circulars, however, have been prepared, and sent by Mr. HUBERTUS to the different points, for this purpose. It is hardly necessary, however, to go into detail, as the character of the Country is such as to warrant not only a large Local but a heavy Through-Traffic;—even the most uninviting portions of the Line have valuable Minerals and Quarries,—unworked—from the difficulties and expense of Transportation,—and those in operation are only half developed from the same cause.

From all the information I could attain, and from my knowledge of the Country, I feel confident that a few years will develop a Traffic on your Road that will tax your abilities to meet,—and before many years, necessitate a Double Track.

If not premature in my suggestion, I would recommend that with the small proportion of Bridging incurred on your Line, that Iron Bridges be adopted. The first-cost would be more than equalized by their durability.

I have great pleasure in stating that your entire Line is one that can be easily built. Most of the material will be found convenient to the point required, and facilities in the shape of public Roads, running into, and close to the Work, at almost any point on the Line, is a fact of consequence to Contractors, in enabling them to get in Supplies,—and will also facilitate the Survey.

In conclusion, I beg to tender my thanks to Mr. HUBERTUS, who not only accompanied me the entire distance, but to whose

energy and foresight in collecting such a large amount of valuable data in connection with the proposed Route, I am deeply indebted,—enabling me, by this means, to make an exploration in a few weeks, that, without the previous knowledge he had obtained, might have taken months,—and at a season of the year when every day was of the greatest consequence.

Since commencing my Report, I received Orders to make an examination of an independent Line, from Ottawa *via* Richmond and Perth, connecting with the original Line at the most favorable point West of latter place. I beg to append the result of my Explorations of that Route.

In connection with the foregoing Report, and in compliance with Orders received for an Examination from Ottawa by Richmond and Perth, Westward, I beg to submit the result of my exploratory Survey of that portion of the proposed line:—

From a personal knowledge of the Country between Ottawa and Perth, I knew that no difficulty existed in finding a very level route to that place.

The first point, therefore, was to establish at what place West of Perth we could effect a junction with our Northern Line, and in a direction to make as little additional distance as possible. This I have succeeded in doing, and in finding a very satisfactory and easy Route.

Starting our Line in the rear of the 2nd Concession of Drummond, immediately North of the Town of Perth, and bearing in a Westerly direction across into Bathurst, a little South of the Toll Gate, into the 2nd Concession, and into the 3rd Concession between Lots 26 and 27;—after crossing this Concession, diagonally, enter the 4th Concession, between Lots 17 and 18; and by following the Valley of Rudsdale Creek, run in a very direct line, crossing the 4th, 5th and a portion of the 6th Concession; entering the Township of South Sherbrooke in the same Concession, pass into the 7th Concession between Lots Nos. 19 and 20, and skirting the South shore of McGowan's

Lake, reach a swamp, extending without interruption to Lot No. 12—raising at this point a small hill and passing through Clarke's Lot, cross the Fall River, West of the Village of Maberley, on the Line between Lots Nos. 11 and 12, near the 9th Concession. The River here is quite narrow, not exceeding 30 feet in width, with firm rocky bed and banks, and quite shallow. After crossing Fall River, we follow the Valley of the outlet of Silver Lake, and skirting the Northern shore of the Lake, pass into a Cedar Swamp at the Western boundary of South Sherbrooke, which gives us easy access to our Northern Line in the 11th Concession, which we join in the Eastern portion of Oso; or, instead of joining at this point, continue along the North shore of Silver Lake to its Western extremity, join our Line on Lot No. 20, near the Line between the 2nd and 3rd Concessions of Oso.

The character of the route above described is one most favorable for location, involving but light work, and in those places where the heaviest cuts occur in Lots 7 and 8, in the 6th Concession of Bathurst, the material is sand and easily moved.

The approach to Fall River, will necessitate a little work, but nothing serious, and the grading round the North Shore of Silver Lake will be light.

In addition to this route, I examined another, leaving Perth, and passing in a North-Westerly direction, through Harper's Corners, and crossing Bennet's Lake at the Narrows, which would require about two spans of 150 feet each. No difficulty exists in joining our original Line in Lots 9 or 10 of the 11th Concession.

The great objection to this Line, apart from the crossing of Bennet's Lake, would be the angle made at Perth, not only lengthening the Line, but without any corresponding advantage; the other is therefore recommended.

Having found a satisfactory Line to the West, my next examination commenced at Perth, and runs Eastward to the City of Ottawa.

Starting from the same point North of the Town of Perth, we bear in an Easterly direction, passing into the 3rd Conces-

sion of Drummond in Lot 7, and passing through the remainder of the Township in that Concession, cross the head waters of Mud Creek through an almost level swamp of cedar, ash and tamarac, and leave the Township of Drummond in the rear of the 3rd Concession. Entering Beckwith at a corresponding point in the same Concession, we cross the line of the Brockville and Ottawa Railway, a little North of the Franktown Station, and passing North of the Village, enter the 4th Concession near the Line between Lots 11 and 12. Continuing in this Concession, pass North of the Village of Prospect, leaving the Township of Beckwith near the centre of the 4th Concession, and entering the County of Carleton, and Township of Goulbourn in the front of the 4th Concession Line. By a reference to the Map, the Line above described will be found an almost perfectly straight line between the Village of Richmond and the Town of Perth, a distance of nearly 30 miles.

As to the character of the Line, it is as nearly level as it is possible for a route to be. The streams crossed are comparatively insignificant, and a more favorable country for a Line of Railway it would be difficult to find.

In point of damages, although a large portion of the country traversed is under a high state of cultivation, the natural depressions followed are generally wooded, and the land can be easily obtained; and in many portions, even where well cultivated, I have been assured many free grants will be given.

From Richmond to Ottawa, no engineering difficulties exist—the only trouble encountered is the entrance to the City of Ottawa. To decide the best point for this purpose a more thorough examination will be required, and I would state that by making a common point at Lot No. 32, in the 1st Concession of Nepean there will be no trouble in connecting with the Line Westward. The Line as traced by me, crosses the Line between the Ottawa and Rideau Fronts, in Lot No. 27, and following the Valley of a small Creek comes out on the Line of the Canada Central, about a mile West of the City.

In case an independent Line is determined upon, none more favorable can be found than the one described. The difference in distance to the common point of junction in the

Township of Oso, some 60 miles, is one mile in favor of the Northern route, but the easy nature of the Country on the Southern Route would more than compensate for its increased length.

I believe this embraces all that is necessary for the present purpose of this Report. It has already exceeded what I at first intended. My description of the Line of route has been more minute than is usual in Reports of the kind, but will be found, when used in connection with the County Maps, to be very useful, and to include nearly all the instruction necessary to the Engineer in charge of your surveys, and if circulated along the Line of Route will be read by persons well acquainted with the country, and the fact of the description agreeing with their own knowledge of the most practicable route, will give the Line a character, and confidence will be felt in the project.

To accompany this Report a Map on a Scale of 8 miles to the inch,—with our Line and connections shown,—has been prepared by COPP, CLARK & Co., of Toronto.

In addition to this, since returning to Ottawa, I have had a Map, on a larger Scale, prepared by Mr. FRANK BAKER, C.E., shewing accurately the position of our Line.

The County Maps, used in the Examination, are herewith returned. The Lines examined will be found laid down on them and will be of great use to your Engineer.

I have honor to be, Gentlemen,

Your obd't Servant,

GEORGE A. KEEFER,

Civil Engineer.